DOCUMENT RESUME

ED 142 807 95 CE 012 065

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TITLE On Estimating the Economic Value of Schooling and Experience: Some Issues in Conceptualization and Measurement. Report No. 221.
INSTITUTION Johns Hopkins Univ., Baltimore, Md. Center for the Study of Social Organization of Schools.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C.
PUB DATE Jan 77
CONTRACT 400-76-0034
NOTE 46p.

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS Economic Research; *Economic Status; *Educational Experience; *Employment Level; Equal Opportunities (Jobs); Human Capital; *Income; Labor Market; Males; Measurement; *Models; Occupational Surveys; Salaries; Social Science Research; Socioeconomic Background; Socioeconomic Influences; Socioeconomic Status; Theories; *Work Experience

ABSTRACT

Survey data for a sample of young adult men who, in 1955, particpated in an Education Testing Service national survey of students and who also responded to a 1970 followup provide the basis for demonstrating the utility of incorporating into socioeconomic achievement models indicators of work experience which correspond to the life-cycle events of schooling, initial full-time entry into the labor market, and assumption of current job, and point out the substantive implications of employing various operations and conceptualizations of the experience variable. The findings suggested that two types of postschooling market experience substantially enhance earnings (work experience and firm experience). Experience acquired during the formal schooling process, however, is of little economic value, as noted by a hypothesis underlying both a segment of a formulation of human capital theory (by J. Mincer) and the conventional techniques employed to estimate postschooling work experience from other variables (e.g., age and schooling). Extreme care should be taken in the conceptualization and measurement of work experience and its specification in earnings models. Conceptual and measurement strategies deemed theoretically incorrect yield estimates of the earnings returns to experience and schooling which are seriously biased. (Author/TA)

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ON ESTIMATING THE ECONOMIC VALUE OF SCHOOLING AND EXPERIENCE: SOME ISSUES IN CONCEPTUALIZATION AND MEASUREMENT

Contract No. 400-76-0034

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Report No. 221

January 1977

CE 012 065

Published by the Center for Social Organization of Schools, supported in part as a research and development center by funds from the United States National Institute of Education, Department of Health, Education and Welfare. The opinions expressed in this publication do not necessarily reflect the position or policy of the National Institute of Education, and no official endorsement by the Institute should be inferred.

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Introductory Statement

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through three programs to achieve its objectives. The Schools and Maturity program is studying the effects of school, family, and peer group experiences on the development of attitudes consistent with psychosocial maturity. The objectives are to formulate, assess, and research important educational goals other than traditional academic achievement. The program has developed the Psychosocial Maturity (PSM) Inventory for the assessment of adolescent social, individual, and interpersonal adequacy. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. It has produced a large-scale study of the effects of open schools, has developed the Teams-Games-Tournament (TGT) instructional process for teaching various subjects in elementary and secondary schools, and has produced a computerized system for school-wide attendance monitoring. The School Process and Career Development program is studying transitions from high school to postsecondary institutions and the role of schooling in the development of career plans and the actualization of labor market outcomes.

This report, prepared by the School Process and Career Development program, examines the value to income attainment of aspects of work experience and schooling.

ABSTRACT

This paper attempts to demonstrate two things. First, sociologists interested in the processes governing income attainment and inequality should consider incorporating into socioeconomic achievement models indicators of work experience which correspond to the following life-cycle events: schooling, initial full-time entry into the labor market, and assumption of current job. The findings presented here suggest that two types of post-schooling market experience substantially enhance earnings. Experience acquired during the formal schooling process, however, is of little economic value, a hypothesis underlying both a segment of Mincer's formulation of human capital theory and the conventional techniques employed to estimate post-schooling work experience from other variables (e.g.; age and schooling). Second, extreme caution must be taken in the conceptualization and measurement of work experience and its specification in earnings models. Conceptual and measurement strategies deemed theoretically incorrect yield estimates of the earnings returns to experience and schooling which are seriously biased.

Acknowledgments

I would like to thank Karl Alexander, Charles Mallar, Susan Radius, and Ross Stolzenberg for their careful reading of this paper.

ON ESTIMATING THE ECONOMIC VALUE OF SCHOOLING AND EXPERIENCE: SOME ISSUES IN CONCEPTUALIZATION AND MEASUREMENT

INTRODUCTION

While the original Blau-Duncan (1967) socioeconomic life-cycle model has provided considerable insight into the processes governing occupational status attainment, its recent extensions to economic market attainments, especially earnings and income, have been far less informative. Although such models have specified the impact of a number of background and schooling influences on economic success, their overall explanatory power has been minimal, with R^2's ranging from .05 to .2 (Spaeth, 1976; Sewell and Hauser, 1972, 1975; Bowles, 1972; Alexander, Eckland, and Griffin, 1975; Duncan, Featherman, and Duncan, 1972; Jencks, et al., 1972; Featherman, 1972; Otto, 1976).[1] The inability of traditional "status attainment" variables (i.e.; social origins, ability, schooling, and occupational status) to account for substantial variance in adult earnings has lead some researchers (e.g.; Jencks, et al., 1972) to the incautious conclusion that "luck" or "chance" plays a major, perhaps predominant, role in the distribution of economic resources. Undoubtedly, random disturbances do function to partially allocate income or earnings among employed adults, especially for men early in their socioeconomic careers (see Mincer, 1974). It is likely, however, that at least some of the residual earnings variance now subsumed under the unsatisfactory term "luck" is,

in fact, due to systematic differences in non-schooling, labor market experiences (Mincer, 1974; Stolzenberg, 1975; Suter and Miller, 1973; Malkiel and Malkiel, 1974; Haworth, Gwartney, and Haworth, 1975; see also the review in Psacharopoulos, 1974), which thus far have been generally neglected in sociological research on personal income inequality.

Socioeconomic achievement models may further our understanding of the dynamics of labor market success, as well as attain greater explanatory power, by incorporating as explanatory variables such non-schooling "human capital investments" as firm experience and other types of work experience. New insight into the economic role of schooling, moreover, may result from an informed assessment of the pecuniary consequences of work experiences (Link and Ratledge, 1975; Featherman and Hauser, 1976; Stolzenberg, 1975; Mincer, 1974). And, as several studies have shown (e.g.; Mincer and Polachek, 1974; Polachek, 1975; Treiman and Terrell, 1975; Featherman and Hauser, 1976; Suter and Miller, 1973; Blinder, 1976), consideration of labor force participation and experiences is absolutely necessary if sexual inequalities in socioeconomic achievement are to be even partly understood.

As is common with many variables employed in social science research, however, no consensus exists as to the most appropriate conceptualization or measurement of "labor market experience." To pose only a few illustrative questions: Is all work experience economically beneficial, or only that which occurs after termination of formal schooling? Are productivity differences appropriately measured by length of total work

experience, by length of experience on current job, or both? How well does age serve as a proxy for experience or for skills? These and related issues, while currently subject to debate among labor economists (Johnson and Stafford, 1973; Link and Ratledge, 1975; Rosenzweig, 1976; Blinder, 1976; Rosenzweig and Morgan, 1976; Hansen and Weisbrod, 1973; Knapp and Hansen, 1976), have received little, if any, attention by sociologists.

My purpose in this paper, then, is to demonstrate the utility of including work experience in "status attainment" models and to point out the substantive implications of employing various "reasonable" operationalizations and conceptualizations of this variable(s). Below I briefly sketch the rationales for positing a salutary "experience" effect and then argue for the appropriateness of a multi-dimensional conceptualization of experience (putting aside, for the moment, the specifics of measurement). I also discuss why the wage returns to schooling may be sensitive to the particular conceptualization of experience employed, as well as to the inclusion or exclusion of any measure of "experience" in earnings functions. In the analysis section I present the estimates of several earnings equations derived from this conceptualization and compare these estimates with those generated by alternative specifications of "labor force experience." First, however, I will describe the sample and variables used in my analysis.

DATA AND VARIABLES

The analysis is based on survey data for a sample of young adult men who, as high school sophomores in 1955, participated in an Education Testing Service national survey of students and who also responded to a 1970 follow-up (designated "Explorations in Equality of Opportunity," or EEO). More detailed descriptions of the EEO schools (Eckland and Macgillivary, 1972) and sampling procedures (Alexander and Eckland, 1973) are available elsewhere. This paper is based on the 519 white male respondents for whom I have complete data on all variables to be analyzed. The education, experience, and earnings variables, with their means and standard deviations, are described below.

EDUC: educational attainment, scaled as years of schooling completed ($\overline{X}$ = 14.49; σ= 2.60);

TOTALEXPER: total work experience. This is the sum of total number of years of employment in the civilian labor force ($\overline{X}$ = 12.65; σ = 3.79);

PRETERMEXPER: years of work experience accrued <u>before</u> termination of academic schooling. Such experience represents both simultaneous labor force participation and enrollment in an academic school program and alternating periods of schooling and work ($\overline{X}$ = 5.43;σ = 4.59);

POSTTERMEXPER: years of work experience accrued after termination of academic schooling ($\overline{X}$ = 7.23;σ = 4.56);

OTHEREXPER: other work experience. This is the amount of work experience accrued before entry into present job, regardless of school enrollment. It is computed as the difference between TOTALEXPER and

FIRMEXPER (see below) ($\overline{X}$ = 7.08;σ = 5.50);

POSTOTHEREXPER: other work experience gained <u>after</u> termination of formal schooling but before entry into present job. It is computed as the difference between POSTTERMEXPER and POSTFIRMEXPER (see below) ($\overline{X}$ = 2.95; σ = 3.59);

FIRMEXPER: <u>total</u> number of years employed on present job ($\overline{X}$ = 5.57; σ = 4.09);

POSTFIRMEXPER: number of years employed on present job after termination of academic schooling ($\overline{X}$ = 4.27; σ = 3.86);

AGE: age in 1970 ($\overline{X}$ = 30.36; σ = .63);

EARN: annual earnings from all sources of employment in 1969 ($\overline{X}$ = 11065; σ = 4596);

LNEARN: natural logarithm of 1969 annual earnings ($\overline{X}$ = 9.23; σ = .42);

WAGE: implied hourly wage rate. This was estimated by dividing annual earnings in 1969 by the product of weeks worked in 1969 and average hours worked per week, also in 1969 ($\overline{X}$ = 4.87; σ = 2.66);[2]

LNWAGE: natural logarithm of implied hourly wage ($\overline{X}$ = 1.47; σ = .48).

Other variables included in the analysis include five indicators of socioeconomic status origins (father's education, father's occupation, mother's education, parental income, and material possessions), academic ability, measured in 1955, and 1970 residential and geographic location.

I use two economic success measures -- annual earnings and hourly wages -- because no general agreement exists as to which is most desirable (see Blinder, 1976; Mincer, 1974). Most notably, annual earnings may be inaccurate as a measure of pure economic success since it confounds wages with a labor supply response (i.e.; hours worked per year).

The logarithms of both of these variables are used for several reasons: (a) again, there is no consensus as to the more appropriate functional form -- dollars or log-dollars. Human capital theory implies the log or semi-log function (Mincer, 1970, 1974; Becker, 1972), but many economists (e.g.; Weiss, 1970; Bowles, 1972; Haworth, Gwartney, and Haworth, 1975) and most sociologists (e.g.; Sewell and Hauser, 1972, 1975; Duncan, Featherman, and Duncan, 1972) use absolute dollars; (b) the log or semi-log function allows an interpretation of the coefficients as proportional returns to changes in the explanatory variables, while the absolute dollars function interprets the results of such changes in actual dollar returns; (c) log (wage or annual) earnings more closely approximate a normal distribution (Mincer, 1970; Stolzenberg, 1973; Hill, 1959); and (d) my conclusions occasionally differ substantially depending upon the economic outcomes, and their functional forms, considered. Thus, rather than arbitrarily present the results for only one, I present estimations for all four earnings functions (EARN, LNEARN, WAGE, LNWAGE).

With the exception of the two firm experience measures, all employment data are taken from self-reported, retrospective career

histories, gathered in 1970 and dating back to before 1955. These employment measures, while superior to those which must be estimated from other variables (e.g.; EXPERIENCE = AGE - SCHOOLING - 5), are of course not without inaccuracies, chiefly errors of recall. Although I have no direct validity or reliability information on these data, similar retrospective life-history data have been successfully validated (Blum, 1970). A serious shortcoming of these particular data is that they do not distinguish between full-time and part-time schooling and employment. Thus, I cannot provide definitive answers to the issues raised in this paper, but the data are highly valuable in elucidating my concerns.

Having briefly described the data and variables to be employed, let me now turn to the pertinent theoretical and methodological issues.

MODELS LINKING EDUCATION, EXPERIENCE, AND EARNINGS

Length of work experience is hypothesized to positively affect earnings for several reasons. Human capital economists, for example, view the returns to experience as returns to an unobservable process, on-the-job training, or as returns to an unobservable variable, productive skills (Mincer, 1962, 1970, 1974; Malkiel and Malkiel, 1974). Dual labor market theorists, on the other hand, explain the economic advantages associated with increased labor market experience as reflections of productivity differences and the customary traditions of institutionalized internal (within-firm) labor markets, whereby workers with seniority (or relatively more experience) are paid more regardless of their productivity (Gordon, 1972; Piore, 1973; Doeringer and Piore, 1971). Finally, the organizational socialization literature (Moore, 1969; Denhardt, 1968; Hall and Schneider, 1972) suggests that increased work experience is positively associated with the development of certain "desirable" attitudes, such as organizational commitment, loyalty, and an orientation toward firm rules and policies, which may themselves be rewarded. This last interpretation is consistent with the thesis propounded by some Marxist economists concerning the positive effect of noncognitive attitudinal traits, especially those tapping such personality dimensions as subservience and docility, on wages and earnings (Edwards, 1976; Gintis, 1971; Bowles and Gintis, 1976).

In the above discussions, I implicitly treated labor force

experience as a homogeneous resource, albeit one subject to alternative measurement strategies. Becker (1964), however, in his formulation of human capital theory, argues that "experience" is not homogeneous; rather, it is assumed to represent two distinct types of vocational training, general and specific. General training is hypothesized by Becker to be useful in a variety of jobs or firms, while the value of specific training is assumed to be firm specific; i.e., productivity-enhancing only in those firms providing such training. Gordon (1972), arguing from a dual-market or perhaps radical perspective, also stresses the importance of the differences between general and specific work experience.

Both schools of thought -- human capital theory and dual labor market theory -- imply then that economic benefits of different types of experience may differ, depending on the perceptions of employers as to which sort of experience is more "useful" or on company policies, among other things. Though scantily researched, this appears to be the case (A. Alexander, 1970; Spaeth, 1976; Flanagan, 1974). Based on theoretical and empirical considerations, then, I argue that length of experience on current job, which is a crude proxy for job-relevant experience (or specific training), is conceptually distinct from length of other market experience, which may be considered general training or preparation, and should be so treated empirically.

The human capital earnings model, as developed by Mincer (1974: 84), assumes that during schooling, no productive (i.e.; earnings-enhancing) time is spent in the labor force. This assumption also implicitly

underlies the procedures used to estimate length of labor market experience from age, years of schooling completed, and probable age of entry into school. These estimation techniques simply cannot tap experience accrued during the formal schooling process. No explicit rationale for this assumption is provided by Mincer or others but one could perhaps realistically argue that individuals both employed and in school are either working part-time or are working in jobs for which they feel no long-term commitment and which they are attempting to leave (via schooling). If this belief approximates reality, then labor market experience accrued during schooling may be less useful in later occupational careers of individuals; in the terminology of human capital theory, such experience would not increase a worker's stock of human capital (i.e.; skills). I should note, though, that this assumption has not been empirically tested, despite the apparent frequency and duration of such experience (see discussion under "Problem" section of this paper). If such experience is indeed unrewarded, it must be analytically and empirically distinguished from work experience gained after termination of formal schooling. The estimated returns to each year of experience may be biased toward zero if a measure of work experience is used which does not differentiate these two types of labor force participation.

I have argued that length of work experience should be decomposed into at least three dimensions: experience accrued during the formal schooling process; experience gained after termination of academic

education but before entry into present job; and post-schooling experience on current job. Many other types of experiences could be distinguished, of course, such as years spent in the military (see Mason, 1970; Coleman, et al., 1972; Griliches and Mason, 1973), or time spent in specific training activities (see Flanagan, 1974; Leigh, 1976) but, in this paper,[3] I am interested in work experience per se, a variable routinely employed by economists and increasingly used by sociologists (e.g.; Featherman and Hauser, 1976; Treiman and Terrell, 1975), rather than specific training or military service.[4] Moreover, the distinctions among the types of work experiences which I have discussed are theoretically derived, or are commonly assumed, and/or are empirically supported.

The Problem

Researchers employing "work experience" as an explanatory variable in studies of income distribution encounter three immediate problems. The first, to which I alluded above, concerns the conceptualization of the variable. What are the salient dimensions of work experience, and should "experience" be considered a homogeneous or a multi-faceted resource? This question is loosely analogous to the issue of aggregated versus disaggregated indices of "socioeconomic status origins" and "significant others' influence," about which some debate existed several years ago among status attainment researchers but which is now largely resolved in favor of disaggregated measures (see Hodge, 1970; Hauser, 1973; Sewell and Hauser, 1972). In spite of the weight of theory and

research, most empirical applications of human capital theory, presumably due to a paucity of data, have ignored the distinction among different kinds of work experience (Stolzenberg, 1975; Mincer, 1974; Polachek, 1975; Link and Ratledge, 1975; Johnson and Stafford, 1973; Featherman and Hauser, 1976; Treiman and Terrell, 1975). The consequences of this often necessary practice have yet to be fully explored.

The second problem is one of operationalization. In the absence of direct data on length of work experience, which is the case for most data sets, researchers must estimate it, usually from information on current age and years of schooling. Commonly the estimate is age minus schooling minus some constant representing likely age of school entry -- 5, 6, or 7 years (Stolzenberg, 1975; Polachek, 1975; Mincer, 1974; Link and Ratledge, 1975; Johnson and Stafford, 1973; Young and Jameson, 1975; Featherman and Hauser, 1976), but it may also be age minus age at leaving school (Welch, 1973), or more complex functions of age and schooling (Griliches and Mason, 1973). It is assumed, with some supporting evidence (Malkiel and Malkiel, 1974), that such proxies are reasonably accurate for workers with continuous employment histories (prime age white males, for example).[5] Even for such "ideal" populations, however, seemingly minor differences in procedures for estimating length of work experience yield different estimates of the earnings returns to experience and to the quantity and quality of schooling (Link and Ratledge, 1975).[6] Despite the obvious deficiencies of these procedures, it is not uncommon to encounter even cruder proxies for experience, such

as unadjusted age, in earnings functions (G. Duncan, 1974; Osterman, 1975; Haworth, Gwartney, and Haworth, 1975; Blinder, 1973; Harrison, 1972; Weiss, 1970; Masters, 1974; Mincer, 1962; Rees and Schultz, 1970). Use of this proxy is based on the loose correlation between age and length of labor force experience. As Rosenzweig and Morgan (1976) observe, however, workers of the same age but with differing levels of educational attainment, frequency and duration of unemployment, and years of military service will differ in "true" levels of work experience. They contend that such differences may be quite consequential for the estimation of economic returns to experience (see the exchange between Rosenzweig and Morgan [1976], Blinder, [1976], and Rosenzweig [1976]). Even when the length of work experience is directly assessed (e.g.; Ashenfelter and Mooney, 1968; Suter and Miller, 1973; Malkiel and Malkiel, 1974), conceptual and measurement difficulties often remain. How much experience, for example, should be credited for part-time employment or for work in seasonal occupations, such as construction (see also the discussions in Suter and Miller, 1973 and Malkiel and Malkiel, 1974)? The second problem, therefore, is one of measurement error, the general consequences of which are well known and need not be recounted here (see Duncan, 1975; Stanley, 1971; and Siegel and Hodge, 1968).

The third problem concerns the timing and sequencing of schooling and employment, a topic of increasing research interest (e.g.; Featherman and

Carter, 1976; Karweit, 1976; Hogan, 1975; Elder, 1975; Winsborough, 1975; Ornstein, 1971; Eckland, 1964). A common, almost unquestioned, assumption of the socioeconomic achievement or income models employed by sociologists and economists is that individuals first complete their schooling and then enter the labor market (see, for example, Blau and Duncan, 1967; Bowles, 1972; Mincer, 1974; Sewell and Hauser, 1975; Jencks, et al., 1972). Indeed, so strong is this presumption that Elder (1975) has identified this straightforward progression from school to work as a "normative" feature of life-cycle career development. This assumed sequencing of events, however, is an oversimplification for a sizeable percentage of American workers. Karweit (1976), for example, reports that 57.3 percent of the white males included in the Coleman-Rossi "Retrospective Life History Survey (RLHS) " resumed schooling in some form after entry into the labor force (for further analyses of these data, see Coleman, et al., 1972; Ornstein, 1971). In an analysis of the 1973 Occupational Changes in a Generation (OCG-II) data, Hogan (1975) found that for the cohort most similar in age to the men analyzed here, i.e., that born in 1937-1941, 14.5 percent reported assuming a <u>full-time</u>, first job before completion of school (see also Winsborough's 1975 analysis of the 1973 OCG-II data). A similar percentage (12.5%) was observed for the 1962 OCG sample (Blau and Duncan, 1967; Duncan, Featherman, and Duncan, 1972).

Although the interpretation of the EEO data is somewhat obscured by my inability to distinguish part-time from full-time schooling and work, the timing of the career events of the EEO men appears generally consistent

with those of the RLHS and OCG men. For men to be analyzed in this paper, 84.5 percent were simultaneously engaged in academic schooling and in employment for at least one year in their career and 34.5 percent were so occupied for five or more years ($\bar{X}$ = 4.2 years). Moreover, after initially "terminating" their academic education and entering the labor force, 20 percent of these men subsequently returned to high school or college; for those who did return to academic pursuits, the mean number of years enrolled in school was 3.5 years. These findings, taken in conjunction with those reported by other researchers, strongly suggest that many individuals deviate from the "normative" pattern of school to work. For this segment of the population, therefore, treating education as causally prior to length of total work experience slights the complexity of the observed temporal processes.

The three problems, while theoretically distinct, often are interrelated in empirical research. If length of work experience must be estimated from other data or variables, the measurement (or operationalization) problem obviously is present. And in the absence of other data (e.g.; on firm experience), the question of conceptualization is unfortunately settled by fiat; the researcher, constrained by the data, must assume the conceptual adequacy of a global, unidimensional measure of experience. Finally, the use of only an index of total labor force experience is not only conceptually inappropriate but may lead to a misspecification of the school-employment relationship as well.

Issues in the conceptualization, operationalization, and specification

of work experience also have important ramifications for assessments of the economic utility of educational attainment. In the absence of extremely irregular work histories, there is an inherent negative correlation between years of schooling completed and years of post-schooling labor market experience. Individuals have a finite "work" life, and these years can be spent only in school or in post-schooling activity, generally in the labor market (at least for the population under consideration here, i.e., relatively highly educated white men). Hence, a trade-off exists between years of schooling and years of post-schooling work activity, especially in data such as these which exhibit a great deal of age homogeneity.

This observation has an extremely important implication. To wit: educational attainment indirectly depresses earnings by reducing economically valuable labor market experience.[7] In order to estimate unbiased earnings returns to educational attainment, experience differentials must be controlled. Experience, however, must be properly measured and specified in order to completely control for its effects. Different indices or proxies of experience correlate quite differently with educational attainment as Table 1 clearly shows.

TABLE 1 HERE

Education appears orthogonal to total market experience (TOTALEXPER), but highly correlated in opposite directions to the components of total experience, i.e., that occuring during the schooling process (PRETERMEXPER) and that occuring after the completion of education (POSTTERMEXPER).

The correlation between years of schooling completed and these two measures of experience are .595 and -.609, respectively.[8] Schooling is modestly positively related to total non-current job experience (OTHEREXPER; r = .251), which contains both pre-termination and post-schooling market participation, but is modestly negatively correlated with post-schooling non-current job experience (POSTOTHEREXPER; r = -.351). It is evident from these correlations that the estimated benefits of schooling will depend on the conceptualization and measurement of length of labor market experience.

Models

The theoretical and empirical literature discussed above indicate that "experience" is most appropriately conceptualized as a multidimensional resource, the dimensions of which also correspond to the following life-cycle events: schooling, initial full-time entry into the labor market, and assumption of current job. The economic consequences of a variety of work "experiences" are best assessed, therefore, by including all three experience variables in earnings functions. One equation conforming to the theoretical work on schooling, experience, and earnings is:

$$(1)\quad Y = \beta_0 + \beta_1 SES + \beta_2 ABL + \beta_3 EDUC + \beta_4 PRETERMEXPER + \beta_5 POSTOTHEREXPER + \beta_6 POSTFIRMEXPER + \beta_7 RESIDENT + u,$$

where Y is, alternatively, EARN, LNEARN, WAGE, and LNWAGE. Multiple socioeconomic status origins (SES) and ability (ABL) are included in this equation because, in their absence, the returns to schooling are overestimated by around 40 percent (Alexander, Eckland, and Griffin, 1975; Griffin, 1976; see also Sewell and Hauser, 1975). The remaining set

of variables (RESIDENT) represents the respondent's place of residence in 1970. It includes three regional location dummies (Northeast, North Central, West) and two urbanization dummies (large town, metropolitan area). I include these to control for differences in money income, rather than real income differences, and to crudely control for demand factors (i.e.; employment opportunities).

Equation 1, above, represents a linear and additive model. The benefits of schooling are thus constrained to be the same throughout the range of schooling, implying, for example, that a progression from the tenth to the eleventh year of schooling is equivalent to a progression from the fifteenth to the sixteenth year. Similarly, a year's increment in experience is assumed to yield constant returns, regardless of the level of experience. The absence of an interaction term between education and experience implies that, for any experience level, the payoffs to schooling are the same, and the benefits of experience are constant for all educational levels. While human capital theory suggests that (a) the returns to schooling and experience decline at higher levels, and (b) the benefits of education (experience) may systematically vary as the level of experience (education) varies (Heckman and Polachek, 1974; Mincer, 1970, 1974; Becker, 1964; Malkiel and Malkiel, 1974; Stolzenberg, 1975; Flanagan, 1974), I found no evidence of such deviations from linearity and additivity in these data for any of the four economic outcome variables.[9] I will, therefore,

present estimates only of the more parsimonious linear and additive model.[10]

A second model to be estimated is identical to equation 1, above, but includes no measure of experience. This misspecified equation is

(2) $Y = \alpha_0 + \alpha_1 SES + \alpha_2 ABL + \alpha_3 EDUC + \alpha_4 RESIDENT + z.$

By comparing the schooling coefficients generated by the competing models,[11] it is possible to evaluate the degree of bias in estimated returns to educational attainment due to the omission of the correct specification of length of work experience.

Finally, five other equations are estimated, all of which specify the impact of SES, ABL, EDUC, and RESIDENT. Each equation, identified by number in Table 2, utilizes different measures or proxies of experience. Estimation of these equations, which themselves are misspecified by the criteria established above, will prove useful in assessing the consequences of incorrect conceptual and measurement strategies. Let me now turn to the results of the estimation of these earnings models.

EMPIRICAL RESULTS

Table 2 presents the experience and education coefficients as estimated by the seven equations. Consider in detail the earnings (EARN) returns to work experience as estimated by these equations. The correctly specified equation (no. 1) provides strong evidence that the economic benefits of experience do indeed depend on "type" of experience. While both POSTFIRMEXPER and POSTOTHEREXPER enhance earnings, the annual returns to the former ($339) are considerably larger than the annual returns to the latter ($221). These results suggest that specific training, as indexed by experience on current job, is economically more valuable than general training, as tapped by other post-schooling market activity. The larger POSTFIRMEXPER coefficient probably reflects company policies concerning the financial and promotional opportunities associated with job seniority as well as skills differentials. The estimates also indicate that work experience accrued during schooling (PRETERMEXPER) is not rewarded by employers. While such employment may have desirable non-pecuniary outcomes (e.g.; acclimate the youth to the world of work or provide adult role models other than teachers or relatives), it seems to offer no economic advantages later in these men's work lives. If, consistent with human capital theory, a skills or learning interpretation is placed on this rather negligible coefficient, "on-the-job" training occurs only in (or is rewarded only in) jobs taken after the termination of formal education. The results obtained for PRETERMEXPER also support both the theoretical formulations of Mincer (1974)

concerning the production of human capital and the assumptions underlying the conventional procedures for estimating length of work experience from other data (see above discussions).

TABLE 2 HERE

The lack of a substantial PRETERMEXPER coefficient suggests that any index of length of work experience which does not differentiate between experience gained during schooling and post-schooling experience will underestimate the economic consequences of experience. Two equations (nos. 3 and 5) employ such measures. Consider first TOTALEXPER (equation 3). Net of the other variables in the model, I estimate that each year of experience, as that variable is measured by TOTALEXPER, is worth $141 annually. Employing TOTALEXPER, therefore, results in estimates of the economic benefits of experience which are downwardly biased by $80 to $200 annually (compare equations 1 and 3). Downward biases are also observed when total experience is partitioned into that which occurs before present job (OTHEREXPER) and current job experience (FIRMEXPER). The coefficients for these two work experiences, neither of which are differentiated by school termination, are $83 (or 38 percent) and $103 (or 31 percent) lower per year than those estimated by post-schooling other experience and post-schooling firm experience (compare equations 1 and 5). Unbiased estimation of the beneficial effects of work experience, whether accrued before or on the current job, requires, then, an analytical distinction between experience gained during the schooling

process and post-schooling market participation. As I show below, however, such distinctions still do not fully capture the complexity of the effects of a variety of experiences.

The estimates of equation 1 showed the differential utility of two kinds of post-schooling experiences -- POSTOTHEREXPER and POSTFIRMEXPER. If a global measure of post-schooling work experience is employed (e.g.; POSTTERMEXPER), as is common in most research, the returns to each year of experience are estimated to yield,on the average, $285 annually (equation 4). This is roughly equivalent to an average of the POSTOTHEREXPER and POSTFIRMEXPER coefficients (see equation 1). In these data, then, the use of a measure of post-schooling experience which does not distinguish between current job and other job employment yields estimates of the earnings-payoffs which are biased both upward (compared to POSTOTHEREXPER) and downward (compared to POSTFIRMEXPER); the magnitude of the biases is about $50-$60 annually. For both theoretical and empirical reasons, then, post-schooling experience must be further decomposed into at least two dimensions: that acquired before entry into present job and that acquired on current job.

Experience on current job and other experience are alternative mechanisms for increasing a worker's stock of human capital; they are work experiences which may not be simultaneously pursued. As with years of schooling completed and post-schooling experience, and for precisely the same reasons, a rather large negative correlation between POSTOTHEREXPER and POSTFIRMEXPER is to be expected (r=-.499 in

these data). Both of these post-schooling experiences, therefore, must be included in earnings equations lest the returns to either be underestimated. Before entering POSTFIRMEXPER in equation 1, I estimated that each year of POSTOTHEREXPER is worth about $ 30 (not shown). After controlling for POSTFIRMEXPER, the returns to POSTOTHEREXPER increase by $191 annually to $221 (equation 1). Other work experience, therefore, registers two contradictory influences on earnings. It directly enhances economic success, but it also indirectly depresses earnings by reducing experience on current job. When the negative association between POSTOTHEREXPER and POSTFIRMEXPER is statistically controlled, the economic impact of POSTFIRMEXPER also increases, from $100, as estimated in the absence of controls for POSTOTHEREXPER (equation 6), to $339 (equation 1). Hence, if other market experience is not controlled (e.g.; Birnbaum, 1976), the salutary effect of job seniority or firm experience is likely to be underestimated.

The coefficients presented in Table 2 demonstrate that even for those data sets which allow direct assessment of length of work experience, conceptual and measurement strategies are crucial for the correct estimation of the economic benefits of work experience. Proxies for experience, such as age, tend to perform even more poorly than do the most ill-conceived direct measures. AGE actually depresses earnings, though the coefficient is not statistically significant (equation 7). Given the age homogeneity of this sample, age is a particularly inadequate substitute for experience,[12] but it is

informative to note that were this the measure employed one would conclude that experience is worth nothing in the labor market.

Thus far I have concentrated on the differing estimates of the benefits of labor force participation. Estimates of the earnings returns to educational attainment, however, are also very sensitive to alternative indices of experience. A year of schooling is worth around $439 annually if experience is appropriately specified (equation 1), and $436 per year if experience is measured by PRETERMEXPER and POSTTERMEXPER (equation 4). The equations containing OTHEREXPER and FIRMEXPER, FIRMEXPER only, and AGE (equations 5, 6, and 7 respectively) indicate that the returns to an additional year of schooling are notably lower, around $180-$225 per year. When experience is indexed by TOTALEXPER, the experience measure almost orthogonal to schooling (see Table 1), each year of educational attainment is worth only $169 annually, essentially identical to that estimated in the absence of <u>any</u> controls for experience (equation 2), and more than $270 lower than that estimated by equation 1. The economic benefits of schooling are biased downward by as much as 62 percent simply because of incorrect conceptualization and measurement of length of work experience.

These results also indicate that, for the reasons discussed above, socioeconomic achievement models which exclude work experience risk seriously underestimating the economic benefits of incremental schooling (compare the EDUC coefficients in equations 1 and 2).[13] I should note that this downward bias in estimated schooling returns (50 to 60 percent)

is not simply a function of either the relatively young age or the age homogeneity of this particular sample. Featherman and Hauser (1976), using a representative sample of 20-64 year old American males in 1973, report that the net returns to schooling increase 38 percent after controlling for experience. The problem, then, would appear to be rather general. While I have focussed my attention on annual earnings, the results for both education and experience are quite consistent across economic outcomes, demonstrating that the biased estimates are not an artifact of the measure of economic success employed.

Sociologists have often concerned themselves with the relative importance of "ascription" versus "achievement" in adult socioeconomic achievement. Such information is assumed useful in judging the openness or rigidity of a society's stratification structure (Blau and Duncan, 1967). Based on the standardized regression coefficients estimated by four of the seven equations (nos. 2, 3, 6, and 7), one would conclude that education and/or work experience and one or another indicator of status background (generally parental income) were of equal importance, with coefficients on the order of .1. Equation 1, the correctly specified equation, suggests, however, that POSTFIRMEXPER is relatively more important (β=.284), followed rather closely by EDUC (β=.249) and then POSTOTHEREXPER (β=.173). The estimated effects of the "human capital" variables, especially educational attainment and post-schooling firm experience, are considerably larger than those observed for any single indicator of socioeconomic status origins (parental income = .125).

These rankings hold for all wage and earnings variables. Not only do the absolute benefits of "investments" in schooling and experience differ according to the conceptualization of experience, but so do our assessments of the relative influences of status origins versus intervening career attainments and contingencies.

CONCLUSIONS

I have attempted to demonstrate two things in this paper. First, sociologists interested in the processes determining economic achievement and inequality should begin to incorporate into their models a variety of labor market experiences. The addition of three experience variables to a rather simple earnings model did increase the explained variance in earnings by 5.2 percent (or a proportional increase of 60 percent) for the men analyzed in this paper. Post-schooling work experience was found to substantially affect earnings, with post-schooling firm experience being somewhat more efficacious than other kinds of post-schooling labor force participation in enhancing economic success. Work experience acquired during the academic schooling process, however, is not financially rewarded. These results provide external support both for parts of human capital theory and for the implicit assumptions employed to estimate length of experience from age and schooling.Consideration of market participation, moreover, not only increases our understanding of the personal determinants of socioeconomic achievement but, also, provides more information about the role of educational attainment in influencing economic outcomes.

Second, extreme care must be taken in the conceptualization, measurement, and specification of work experience. Estimates of the economic benefits of experience and schooling appear very sensitive to the treatment of experience, this despite the age-homogeneity, education, and other social characteristics of the EEO sample. My findings are suggestive rather than definitive, and, certainly, more research is

needed to further define and refine the most appropriate "experience" measure and to identify those segments of the work force which may be most susceptible to the problems discussed here. Nevertheless, the analysis presented here does demonstrate the need for serious attention to the conceptual bases of the construct "work experience."

FOOTNOTES

1. I am not arguing that these models are either uninformative or irrelevant. Quite the contrary, they have proven extremely useful, for example, in assessing the degree to which and the manner in which socioeconomic status origins influence a variety of adult outcomes.

2. Jones and Husby (1976) criticize the estimation of hourly wage from weeks and hours worked for two possible inaccuracies. First, most studies rely on a Census-type item, "number of hours worked last week." Hours worked last week may not be typical of the average number of hours worked in a week. Second, both weeks worked and hours worked are usually coded into categories, rather than actual hours or weeks worked, and the categories are then assigned values representing their mid-points. This, too, may create error (see, however, Fuchs, 1967). The weeks and hours worked data employed in the present study do not suffer from these particular inaccuracies.

3. Research is currently being conducted on the impact of many career contingencies, including military service and vocational training. See Hansen and Weisbrod (1973) for a complete cataloguing of potentially relevant "experiences."

4. Ideally, I would like to, but cannot, distinguish between "length of experience" on a job or in the market and the amount of "learning"

or "investment" in human capital which takes place during this time. Rosen (1972) presents a well-argued theoretical exposition of this issue.

5. Measurement problems are somewhat mitigated in my analysis because I have direct (but retrospective and self-reported) information on the work histories of my sample. Thus, I am not forced to and, indeed, cannot even use the usual procedures employed to estimate length of work experience; e.g., AGE - EDUCATION - 5. Because AGE has so little variance (see "Data and Variables" section), any variable constructed as a linear function of it and education is, in fact, a linear function of schooling. In the present data, for example, experience, as estimated by the above specification, correlates at -.98 with educational attainment.

6. Blinder (1976) also notes that the specification of experience as (AGE - EDUCATION - 5) imposes certain linear restrictions on the coefficients of quadratic and interactive experience and schooling variables. The problems associated with these techniques are magnified if they are used to estimate the length of labor force experience for most working women (e.g.; Featherman and Hauser, 1976; Polachek, 1975; Rosenzweig and Morgan, 1976; Rosenzweig, 1976).

7. I am assuming, of course, that the experience-earnings slope is positive. Mincer (1974: 70) has shown that the net earnings returns to experience are negative only in the years immediately preceding retirement.

8. Very few published studies report correlations between education and labor market experience. Ashenfelter and Mooney (1968) report that, for a cohort of Woodrow Wilson Fellows, educational attainment and post-schooling experience correlates at -.59, a statistic quite close to the correlation observed in these data. Using a sample much more variable in age (20-64 year old men) than either these data or those analyzed by Ashenfelter and Mooney, Featherman and Hauser (1976) observe that this correlation is -.43.

9. The nonlinear and nonadditive earnings model included squared PRETERMEXPER, POSTOTHEREXPER, POSTFIRMEXPER, and EDUC terms and three multiplicative schooling-experience terms. None of the coefficients were significant at the .05 level. The absence of such effects in these data do not dispute either human capital theory or the results of past research. It simply indicates that, because of (a) the relatively small sample size and (b) the relatively young age of these men (i.e.; skills depreciate as workers become older), the statistical and substantive importance of these effects was minimized.

10. I also attempted to determine if the estimated effects of experience and education on occupational status and work satisfaction differed according to the measure of experience used. I found little evidence that such differences exist.

11. All estimates of the returns to education reported in this paper are estimates of the total effect of education; i.e., directly and

indirectly through the placement of men in the occupational structure.

12. For example, age correlates with the other experience variables at magnitudes of only .09 to .26.

13. I refer only to the structural estimate of schooling. Because POSTOTHEREXPER and POSTFIRMEXPER follow the termination of schooling, they may be excluded from earnings or wage functions without biasing the schooling coefficient. It must be remembered, however, that the resulting schooling coefficient is a reduced-form, not structural, estimate.

TABLE 1

ZERO-ORDER CORRELATIONS BETWEEN
EDUCATIONAL ATTAINMENT AND VARIOUS MEASURES
OR PROXIES OF WORK EXPERIENCE

(N=519)

TOTALEXPER	-.010
PRETERMEXPER	.595
POSTTERMEXPER	-.607
OTHEREXPER	.251
POSTOTHEREXPER	-.351
FIRMEXPER	-.347
POSTFIRMEXPER	-.391
AGE	-.283

TABLE 2

METRIC ESTIMATES OF THE EFFECTS OF EDUCATION AND ALTERNATIVE MEASURES OF EXPERIENCE[a]

(N=519)

		Dependent Variables			
		EARN	LNEARN	WAGE	LNWAGE
Correctly Specified:					
Eq. 1:	EDUC	439[b]	.039[b]	.182[b]	.030[b]
	PRETERMEXPER	11	-.001	.003	.001
	POSTOTHEREXPER	221[b]	.020[b]	.068	.015[b]
	POSTFIRMEXPER	339[b]	.028[b]	.123[b]	.023[b]
	R^2	.140	.136	.068	.062
Misspecified:					
Eq. 2:	EDUC	168	.015	.089	.012
	R^2	.088	.092	.049	.042
Eq. 3:	EDUC	169	.015	.089	.012
	TOTALEXPER	141[b]	.011[b]	.048	.010
	R^2	.101	.102	.053	.048
Eq. 4:	EDUC	436[b]	.039[b]	.181[b]	.029[b]
	PRETERMEXPER	11	-.000	.003	.001
	POSTTERMEXPER	285[b]	.024[b]	.097[b]	.019[b]
	R^2	.134	.133	.065	.060
Eq. 5:	EDUC	222[b]	.019[b]	.104	.014
	OTHEREXPER	138[b]	.011[b]	.047	.010
	FIRMEXPER	236[b]	.018[b]	.074	.014
	R^2	.108	.106	.055	.049
Eq. 6:	EDUC	223[b]	.019[b]	.104	.014
	FIRMEXPER	100[b]	.008	.028	.004
	R^2	.095	.097	.050	.043
Eq. 7:	EDUC	182	.015	.108	.012
	AGE	-214	-.018	-.033	-.013
	R^2	.091	.096	.050	.044

[a]Other variables in the equations were SES, ABL, and RESIDENT.

[b]Coefficient at least twice the size of its standard error.

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